COMMONWEALTH OF KENTUCKY

BEFORE THE ENERGY REGULATORY COMMISSION

* * * * *

In the Matter of

THE ENERGY REGULATORY COMMISSION VS. THE UNION LIGHT, HEAT AND POWER COMPANY	))	CASE NO. 8133

SHOW CAUSE ORDER

On October 9, 1980, two natural gas explosions and a fire at Simon Kenton High School, Independence, Kentucky resulted in the death of one (1) person, personal injuries to thirty-seven (37) others, and extensive property damage. The Commission Staff conducted an investigation into the causes of the accident on October 9-16, 20, 27-28, November 6-8 and December 1-4, 8, 1980. The findings of the Staff Report, dated January 20, 1981, which is attached hereto as Appendix "A", indicate probable violations of this Commission's regulations by The Union Light, Heat and Power Company which may have contributed to the accident.

IT IS THEREFORE ORDERED That The Union Light, Heat and Power Company shall appear at the offices of the Energy Regulatory Commission at Frankfort, Kentucky, on the 17th day of February, 1981 at 10:00 a.m., Eastern Standard Time, to show cause, if any it can, why it should not be subject to the penalties prescribed under KRS 278.990 and KRS 278.992.

Done at Frankfort, Kentucky, this 28th day of January, 1981.

ENERGY REGULATORY COMMISSION

Vice Chairman

Commissioner

ATTEST:

Secretary

APPENDIX "A"

REPORT
OF
INVESTIGATION
AT
SIMON KENTON HIGH SCHOOL
CONCERNING
NATURAL GAS EXPLOSIONS AND FIRE
ON
OCTOBER 9, 1980

January 20, 1981

COMMONWEALTH OF KENTUCKY

Energy Regulatory Commission
730 Schenkel Lane
Frankfort, Kentucky 40602

SYNOPSIS

At approximately 11:55 a.m. and 12:20 p.m., EST, October 9, 1980, two natural gas explosions and a fire at Simon Kenton High School, Kenton County, Kentucky, served by Union Light, Heat & Power ("Union"), resulted in death to one (1) person, personal injuries to thirty-seven (37) others, and a large but undetermined amount of property damage.

The accident occurred during Phase II of a planned two-phase uprating (increase of gas pressure) by Union of certain natural gas transmission pipelines from 60 PSIG to 200 PSIG. Phase I, the uprating of 4 and 1/4 miles of 4 inch transmission pipeline to 200 PSIG, had been completed without incident. The first explosion and a fire occurred during or immediately after completion of the third step of Phase II, the increase of pressure from 130 to 165 PSIG, to eleven (11) miles of a 4 inch transmission or "feeder" line. The high school's 3 inch service line had been connected directly into the 4 inch transmission line being uprated and the increased pressure apparently was transmitted (without a primary regulator) directly into the boiler room of the school, where the first explosion and fire occurred. The second explosion, some thirty (30) minutes later, occurred after Union employees closed a 4 inch gas line valve downstream of the meter and regulator inside the burning

boiler room, which apparently changed the pattern of flow of the escaping gas in the service line near the fire or firemen providing a water fog for the gas company personnel inadvertently snuffed the flame. Attempts to locate a curbside valve were unsuccessful until after the second explosion because it was unmarked and about 12 inches underground.

The uprating procedure

Increased demand for gas by customers in the southern portion of its system prompted Union to formulate a plan for uprating approximately 15 and 1/4 miles of 4 inch pipeline in Kenton and Boone Counties, Kentucky, from a pressure of 60 PSIG to 200 PSIG. The plan contemplated that the uprating would be accomplished in two phases:

Phase I consisted of uprating 4 and 1/4 miles of 4 inch natural gas transmission line to 200 PSIG, and was completed without incident before Phase II was commenced.

Phase II involved the uprating of 11 miles of 4 inch transmission or "feeder" pipeline downstream of the Phase I line, to be done in four steps, or from 60 to 95 to 130 to 165 to 200 PSIG. (See copy of pressure chart located on outlet side of throttling valve at Latonia Lakes Station)

The plan apparently was in compliance with the requirements of state and federal regulations governing uprating

by natural gas pipeline companies. [Part 192 of Title 49 CFR, Subpart K--Uprating, at §192.551, *et seq.*, as adopted by Energy Regulatory Commission of Kentucky as 807 KAR 50:045, Section 3(1)(a)]

The first explosion

Union commenced work on Phase II at 7:00 a.m., October 9, 1980, and had completed the first step, increasing the gas pressure in the line from 60 PSIG to 95 PSIG by 8:15 a.m. Leak survey crews found five (5) leaks, two (2) of which were considered potentially hazardous and repaired. The second step, increasing pressure from 95 PSIG to 130 PSIG, was completed by 10:20 a.m. No additional leaks were found at that time, and the three (3) leaks previously found were again evaluated as not potentially hazardous.

At 11:50 a.m., the third increment brought the line pressure to 165 PSIG. Union's mobile leak survey crew #1 was on its way back to the south end of the system being uprated to again perform a leak survey of the entire line. They passed the Simon Kenton High School at approximately 11:55 a.m., when they observed police and fire emergency units at the school and observed fire in the school. (See Photographs 1-2-3 and Drawing) One of the two mobile leak crew employees immediately began trying to locate the curb box by means of electronic and visual scan of the area near the street. The

other employee immediately contacted the dispatcher by radio and requested that the Supervisor of Pressure Control be notified. He then requested the dispatcher to contact the Central Records Office for a curb box location. By this time, additional gas company employees had arrived at the accident site.

Three eyewitnesses to the first explosion, Mrs. Linda Whittenberg, an art teacher at Simon Kenton High School, and two of her students, Scott Wallin and Gene Kavanaugh, stated that just prior to the first explosion they heard a loud hissing, blowing sound near the southeast corner of the art room. A concrete block wall separated the art room and the boiler room. Wallin and Kavanaugh were located closer to the wall that was blown down than the teacher or the other ten students.

This testimony from the teacher and students plus a review of local television footage of the fire confirms our belief that excessive pressure caused a separation of the piping from a compression coupling located upstream of the single stage regulator on the inside east wall of the boiler room.

At approximately 12 noon, Officer Russell E. England, a policeman from Independence, Kentucky, arrived at the accident site. He stated that he began directing other police and firefighting units to the scene.

The second explosion

After unsuccessfully attempting to locate the valve box, three (3) of the Union employees approached the school, to try turning off the gas supply inside the school building. The aluminum louver in the boiler room had either blown out or melted as a result of the fire following the initial explosion. Through the smoke and fire they could see a vertical pipe directly in front of the window with a shut-off valve that was accessible through the window. (See Photographs 4 and 5) After warning the firefighters not to extinguish the burning gas supply, they asked that a water fog be provided, enabling them to get close enough to operate the shut-off valve. Their first attempt failed when one employee tried to turn the valve with an eighteen (18) inch pipe wrench. A second attempt was successful with a larger wrench and two additonal employees turning the valve. As the Union employees turned to leave this area, one of the employees noticed that the sound of escaping gas grew more intense. At this point in time the second explosion occurred, at approximately 12:20 p.m., EST.

Finding and turning off the gas supply at the curb

After the injured people were removed from the building, Officer England noticed that gas company employees were attempting to break the blacktop with a pick in the edge of the road in search of the street valve connecting the service line to the gas supply. He asked for and received permission from these employees to bring his backhoe to the site to assist

in locating the shut-off valve. Arriving with the backhoe at 12:30 to 12:40 p.m., he immediately began digging. He was unable to locate the valve in this area. After digging in another location requested by gas company employees, the building architect, Robert Hayes, arrived and showed him approximately where the service line was located. He dug in this area and uncovered the three (3) inch service line. The gas company superintendent asked him to dig between the exposed service line and the street. Officer England said that he took a minimum of two (2) scoops of dirt off at this site when the bucket of his backhoe hit something. Hand digging uncovered the curb box lid and an employee then inserted a street key through the opening and turned off the gas supply to the school. The gas supply was turned off at approximately 1:40 p.m. Officer England estimated that the valve box cap was approximately twelve (12) inches below the ground surface. (See Photographs 8-9-10 and 11)

Background

Union allegedly conducts an annual public building inspection of all schools and churches in its service area. Records indicate that the Simon Kenton High School was last inspected on December 3, 1979. The inspection record shown to Commission staff personnel was a computer read-out sheet with very little information on it. Nothing is provided on the inspection form to indicate that accessibility to the

curb shut-off valve is checked as part of this annual inspection; however, Union officials insist that this was part of the inspection.

The inspection form for Simon Kenton High School of December 3, 1979, indicated that no irregularities were found; however, a check with the District Highway Department Engineer and his staff who are responsible for maintenance and repair for Kenton County highways revealed that nothing had been done in the vicinity of the street valve for a number of years that would cause the valve box lid to become covered with dirt, if it were not covered at the time of Union's last inspection.

The Kenton County Board of Education is located on the same grounds with the high school and the building is approximately one hundred fifty (150) feet from the street valve. The Kenton County Superintendent, Mr. Bert Bennett, stated that school personnel had not made any changes that would have caused the valve box lid to become covered with dirt. He further stated that the location of his office gave him a clear view of the area in question and he would have been aware of changes made by anyone at the valve box location, and that there had been no activity conducted in the area of the valve box in recent years that would have covered it.

Findings of fact

1. Union's employees were not aware of the fact that the high school's service line was connected directly into the 4 inch transmission line being uprated. (See Photographs 8 and 9, also copy of U.L.H.&P. News Release dated October 10, 1980) Apparently this connection was not recorded on Union's maps, as required by 807 KAR 50:015 Section 17(1)(d).

Ref. 1969 P.S.C. Regulations Rule XVII(1)(d), Page 31

2. There apparently was no primary regulator for reducing the pressure of the gas entering the service line of the high school from the 4 inch transmission line from 200 PSIG to 50-60 PSIG, as required by CFR 192.197(6)(c), Ref. USAS B 31.8-1968 [845.32(d) page 57] Adopted by 1969 P.S.C. Regulations - General Provisions Rule 1.5 and Gas Provisions Rule III(1.a)

3. Union's employees performing the uprating procedures were not aware of the lack of a regulator to step down the pressure entering the high school's service line.

4. Union's employees were not aware of, and could not quickly find, the location of the curb cut-off valve for the high school's service line, as it was unmarked, covered with earth and sod, making it inaccessible to these employees. (See Photographs 10 and 11)

5. Inadequate record keeping on the part of Union made it impossible for the crews following the uprating

program who were uprating transmission lines AM-3 and UL-7 to know that the three (3) inch service line was connected to the four (4) inch transmission line instead of the two (2) inch distribution line. (Both lines were located in the same ditch, at this particular location, approximately twelve (12) inches separating the lines.)

(Further tests by Union of buildings in this affected area revealed that four (4) private dwellings and one (1) church were also being supplied directly from the uprating transmission line, without benefit of a primary regulator. The reason given by gas company management personnel for missing the church was that the wrong address was listed on the computer read-out. No reason or explanation was given for over-pressuring the private residence. The private dwellings are located on Don Street in Independence, Kentucky, and the Nicholson Church of Christ is on Nicholson-Walton Pike. Fortunately these supply systems withstood the excessive pressure without causing further explosions and fire. See copy of U.L.H.&P. news release dated October 15, 1980.)

6. A compression coupling located inside the boiler room, but upstream of the single stage regulator, (See Photographs 6 and 7) separated from the gas piping apparently by excessive pressure because a swing joint was not properly braced as required (at the time of installation), violation

of Gas Transmission and Distribution Piping Systems, USAS B31.8-1968 834.4(b) page 28. Adopted by 1969 Ky. P.S.C. Regulations - General Provisions, Rule 1.5 and Gas Provisions Rule III(1a)

7. The second explosion occurred approximately twenty-five (25) minutes after the initial explosion. This explosion would not have occurred if Union employees had been able to locate the curb box for the street valve shut-off. Office of Pipeline Safety Operations, U. S. Department of Transportation, Minimum Federal Safety Standards, Title 49 CFR Part 192.365(c) Ref. B31.8-1968, USAS Gas Transmission and Distribution Piping Systems, 849.13(d), at page 65, states that each underground service line valve must be located in a covered durable curb box or standpipe that allows ready operation of the valve and is supported independently of the service lines. These regulations are adopted by Energy Regulatory Commission Regulation 807 KAR 50:035, Section 3(a). The initial explosion occurred at approximately 11:50 a.m., and the shut-off valve was finally operated at 1:40 p.m., thereby shutting off the source of supply.

8. The public building inspection, a part of the gas detector survey conducted on an annual basis by Union for principal business areas and special buildings, was not being fully adhered to in that accessibility to the curb

shut-off valve was apparently not checked and found accessible on the December 3, 1979 inspection. Information provided to this Commission by the District Highway Engineer and his staff, along with the Superintendent of Kenton County Schools, indicates that no changes have been made in the ground contours in the area of the street valve supplying gas to the Kenton County high school for a number of years. [This is a violation of Energy Regulatory Commission Regulation 807 KAR 50:015, Section 22(4)(a)(3) Ref. 1969 P.S.C. Regulations, Rule XXII, page 34c(F)]

9. Office of Pipeline Operations Regulation 192.615(a) requires that each operator shall establish written procedures to minimize hazards resulting from a gas pipeline emergency. Subsection (2)(6) of this section requires that an emergency shutdown procedure be a part of these written procedures. Union's emergency plan does not incorporate an emergency shutdown procedure.

Respectfully submitted,

Larry L. Amburgey

Larry L. Amburgey
Chief Utility Inspector

E. Scott Smith

E. Scott Smith
Chief Engineer, Gas Section

mfb

The Union Light, Heat and Power Company
News Services Phone 632-2639

NEWS RELEASE

October 10, 1980

A preliminary investigation of the accident Thursday at Simon Kenton High School indicates that a contributing cause to the natural gas explosions may have been pressure uprating work that was being performed in the area at the time by Union Light, Heat and Power Company crews.

Pressure in a 4" feeder main was being increased to accommodate new customer loads south of Independence, Kentucky, where the high school is located. The pressure increase was being performed in accordance with safety procedures prescribed by the U.S. Department of Transportation.

Shortly after pressure was increased from 50 to 165 pounds per square inch, the first explosion occurred at the high school. An investigation following the explosion disclosed that the service line to the school came from the 4" feeder line, rather than the normal 2" distribution line, both of which were located in the same trench. This installation was made in 1970 and Company records do not indicate when the transfer to the other line was made. Neither ULH&P's equipment located within the building nor the school's were made to accommodate the higher pressure.

When the explosion occurred, ULH&P workmen in the area responded immediately to the scene. Two of them were injured in the process of attempting to cut off gas in the building, when the second explosion occurred. The stop-cock at the curb could not be located immediately because it had been covered by soil.

ULH&P is now in the process of cooperating with public authorities from both state and Federal levels in investigating all aspects of the accident.

The exact cause of the first explosion is not known at this time, but it is reasonable to assume the increased pressure was a contributing factor.

Work on the main uprating project has been temporarily suspended. All service lines to customers along the route will be physically tested before the project resumes.

# # #

The Union Light, Heat and Power Company
News Services Phone 632-2639

NEWS RELEASE

October 15, 1980

The Union Light, Heat and Power Company's continuing investigation of the explosion at Simon Kenton High School has developed the fact that gas service to a church in the Independence, Ky., area was fed from the same gas main that supplied the high school.

Four homes in the area were also supplied indirectly from the same main.

Pressure tests on the gas main were apparently a contributing cause to the natural gas explosions at the high school on October 9.

The installations at the church and four homes were also subjected to the same test which led to the incident, and all equipment there withstood the higher pressure. There is no danger of an explosion at these locations, because gas pressures have been reduced back to their normal operating levels since last Thursday.

ULH&P crews are in the process of correcting the hook-ups at the church and four homes. The church is the Nicholson Church of Christ, on Nicholson-Walton Pike. The homes are located on Don Street. ULH&P is re-checking all services in the general area of the feeder line.

(more)

ULH&P is also continuing to cooperate with Federal and state authorities who are investigating the incident. At their request, the gas service connection to the main at the high school is being opened today, as part of the continuing investigation.

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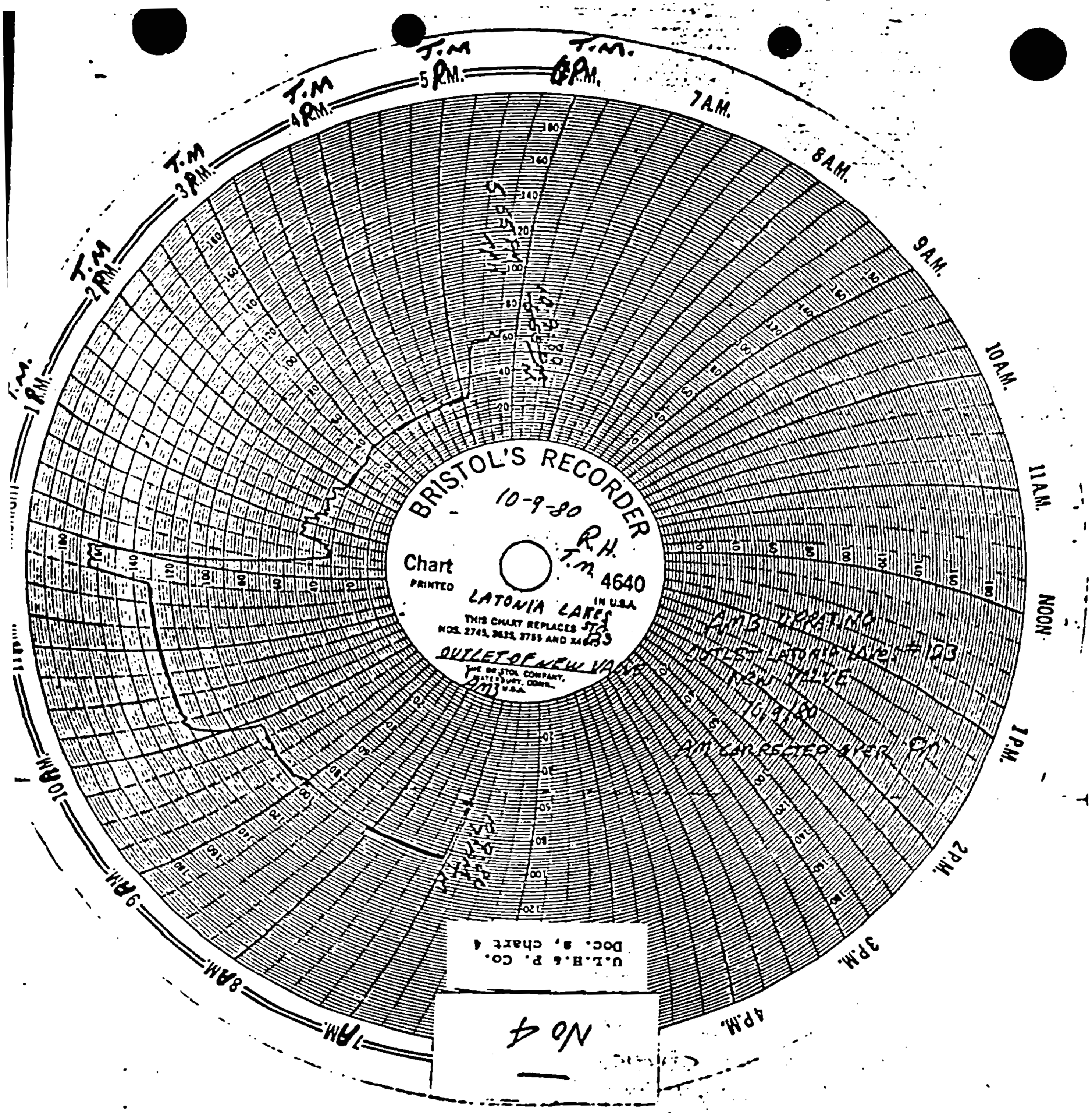
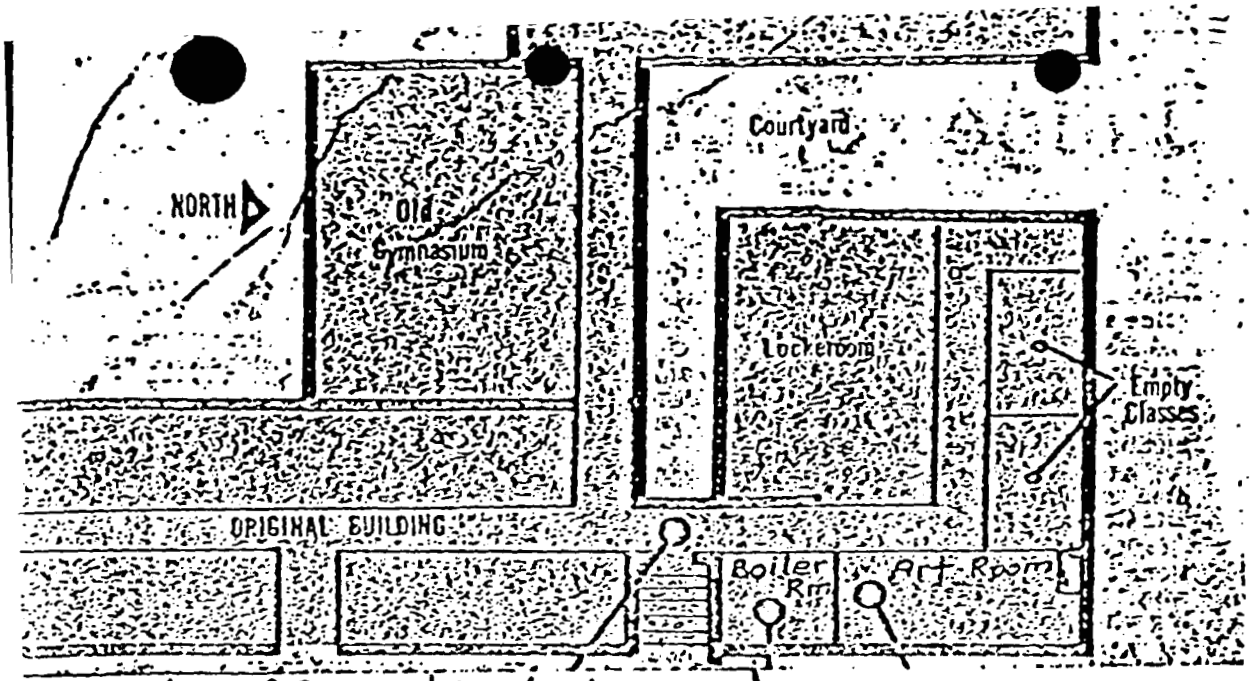


BRISTOL'S RECORDER
Chart 4640
PRINTED IN U.S.A.
10-9-80
R.H.
T.M
LATONIA LAKES
THIS CHART REPLACES NOS. 2745, 3635, 3755 AND
OUTLET OF NEW VALVE
THE BRISTOL COMPANY, WATERBURY, CONN. U.S.A.
U.L.H.& P. CO.
Doc. 8, chart 4
No 4

LATONA LAKES STATION #123
BEGINNING OF UPRATE SECTION
T/L AM3 UPRATING
OUTLET LATONA LAKES #123
INSTREAM OF NEW VALVE
ON 7:00 AM
OFF ~~6:55 PM~~ 5:55PM TMH
10/9/80

AM CORRECTED OVER PM
24hr CHART.
TMH

THE CHART WAS MANUALLY ADVANCED ONE HOUR FROM 7:00 AM TO 8:00 AM BECAUSE THE HUB WAS NOT TIGHT AND IT DID NOT MOVE DURING THE FIRST HOUR TMH



Center of Second Explosion

3" Gas Service Line

Kenton Co Bd. of Educ. - Bldg.

1" = 40' - 12/15/80 - EH.

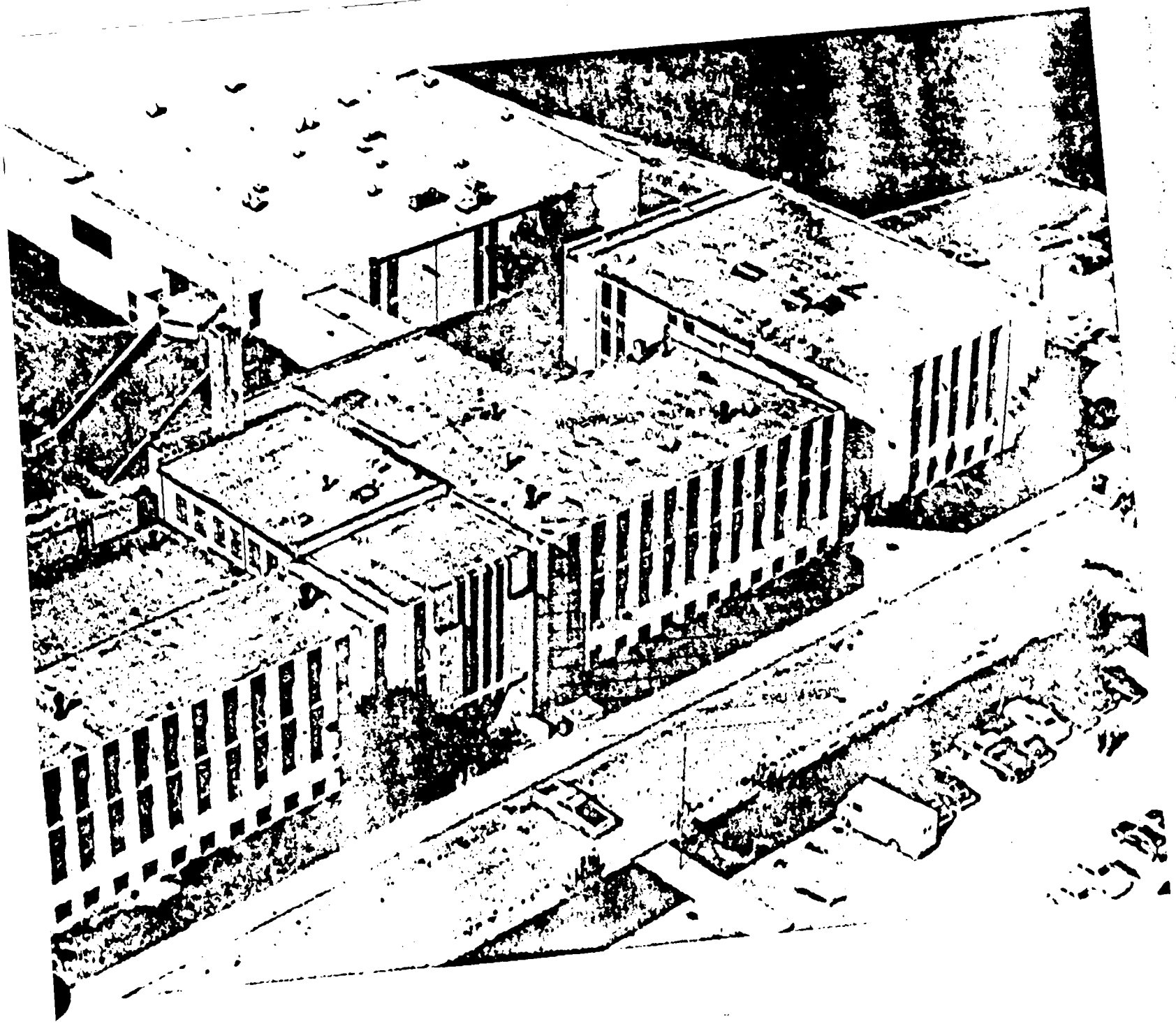
Gas Service Connection
Simon Kenton High School
Served by. Union Lt. Ht. & Pr. C

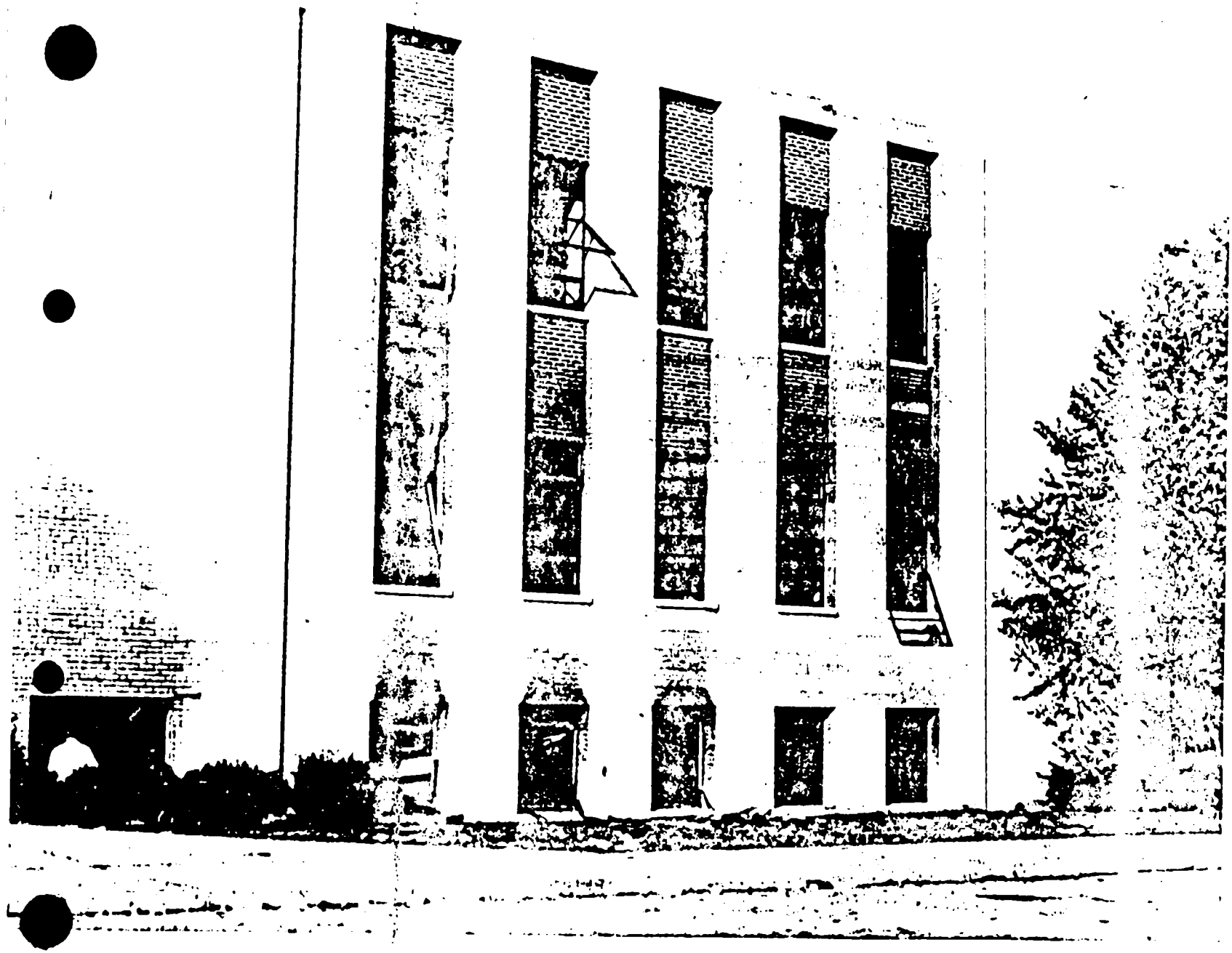
4" Transm. Ln. ℄

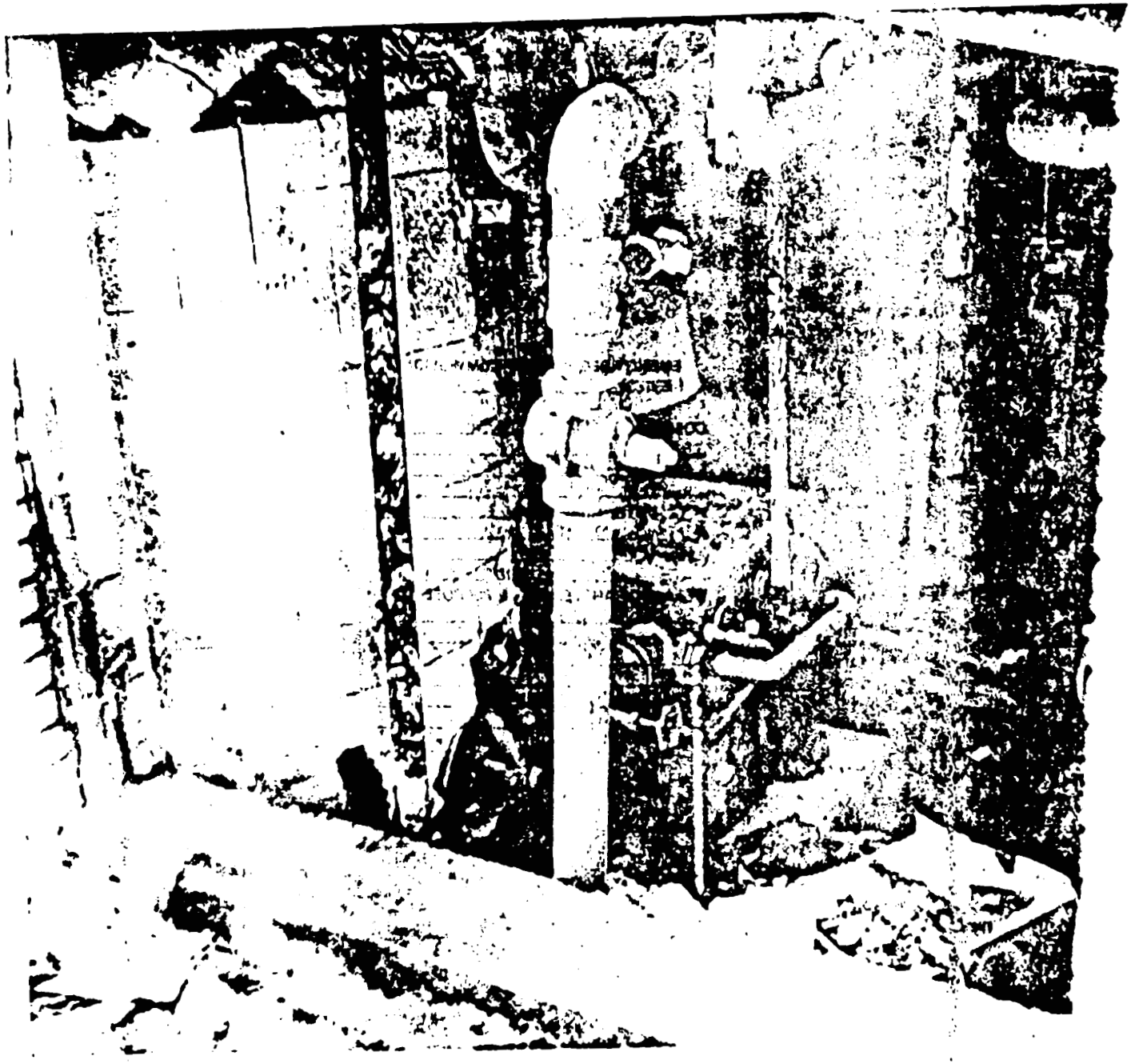
2" Distribution Ln. ℄ St. Hwy. 17 ℄

Edge Pv. 3

Edge Pvmt. ℄

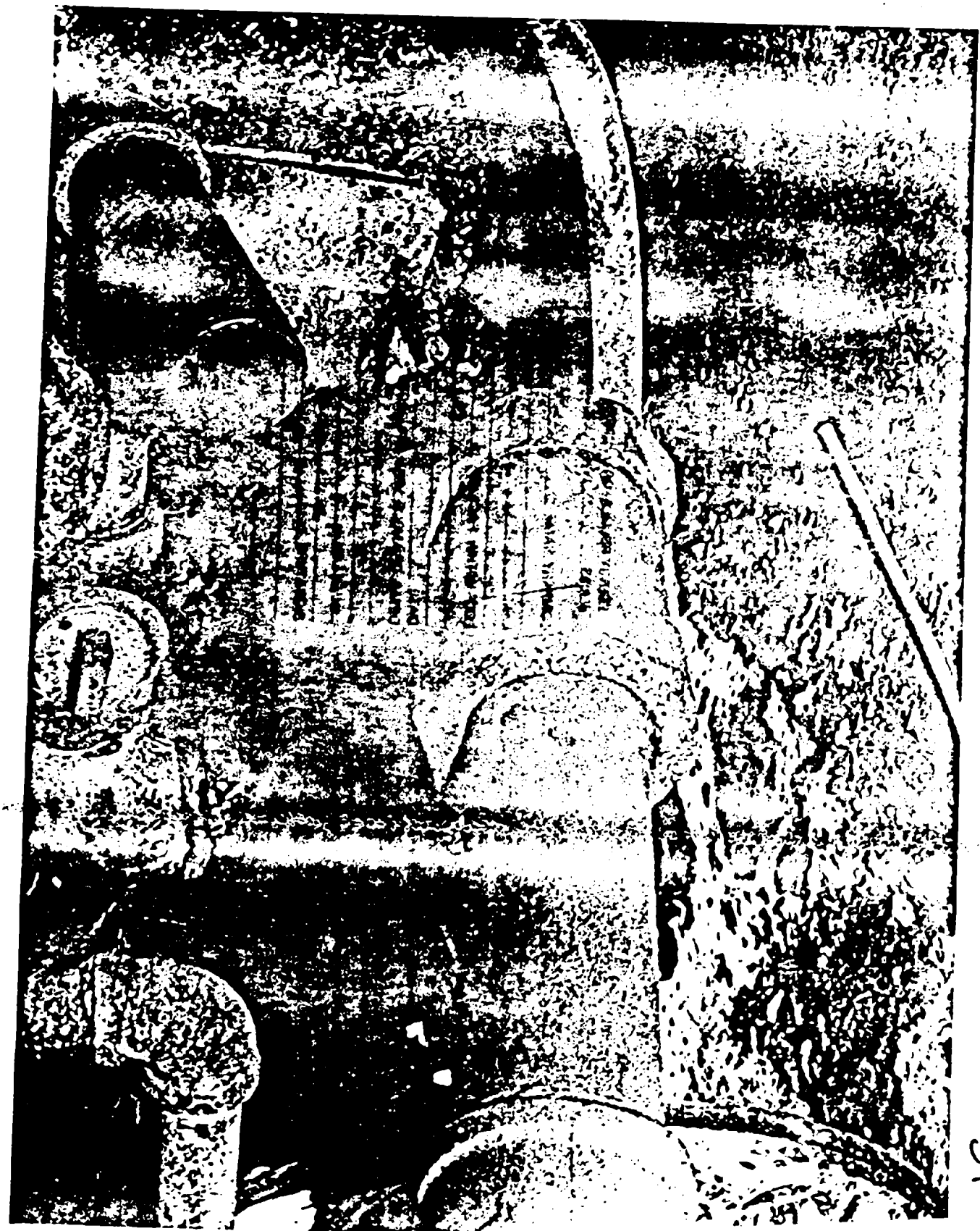






3B

W



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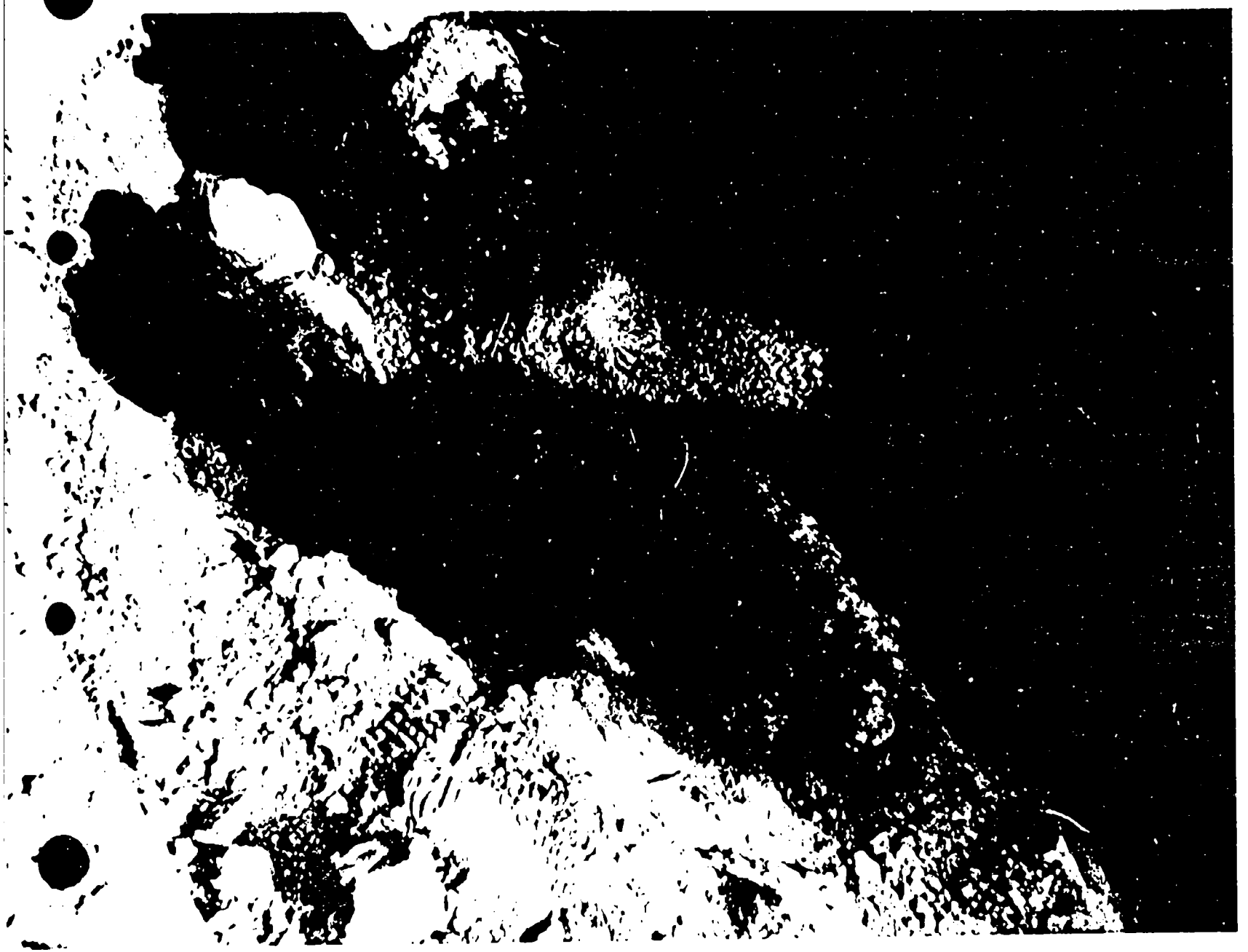
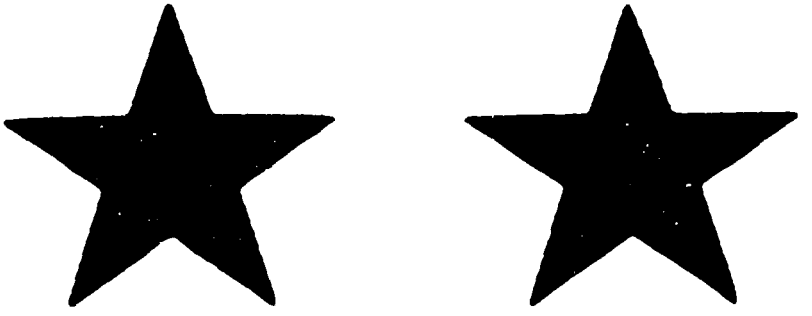


6A

CORRECTION



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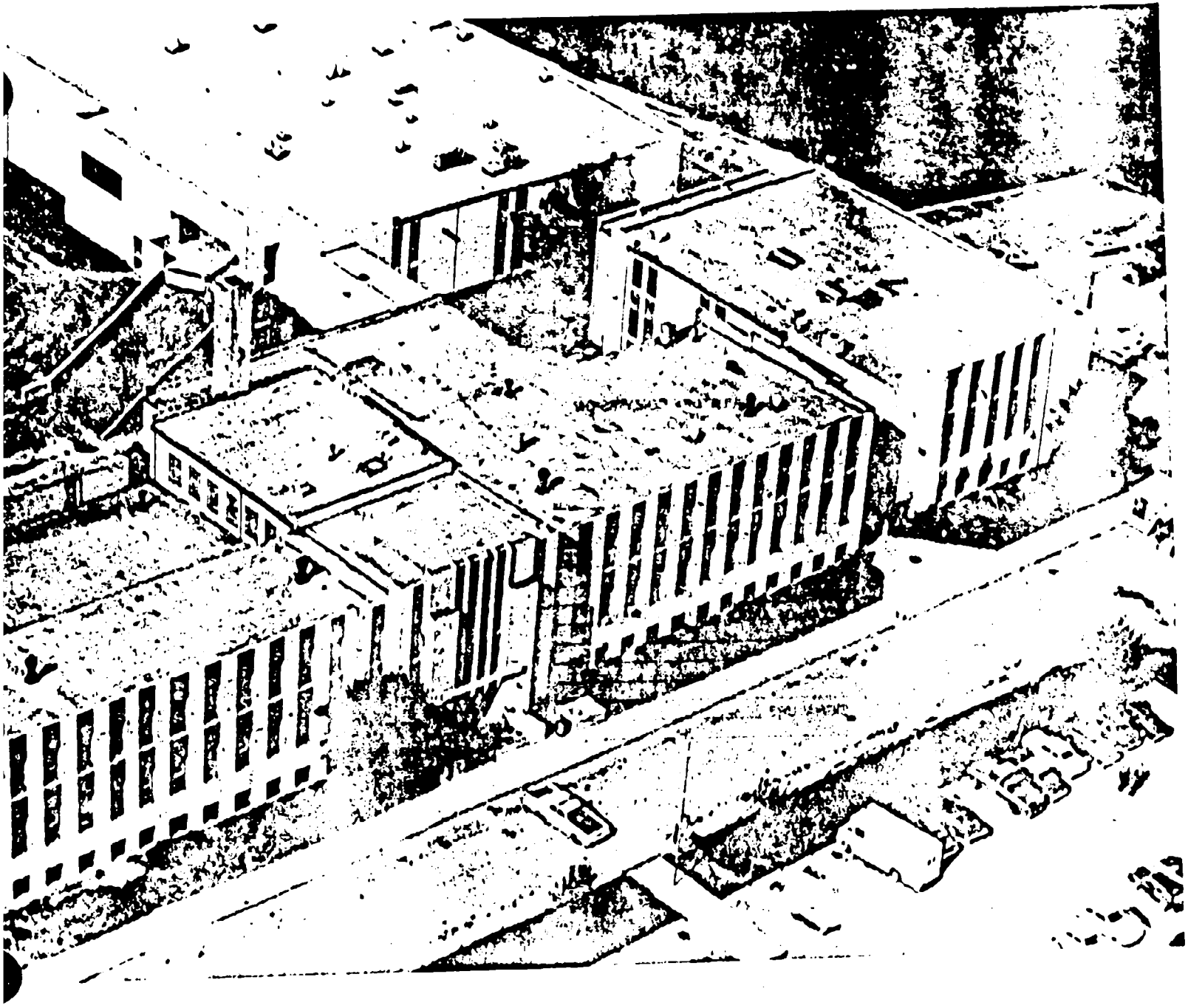


ENERGY REGULATORY COMMISSION
SERIES _____ NO. 1

COMPANY NAME

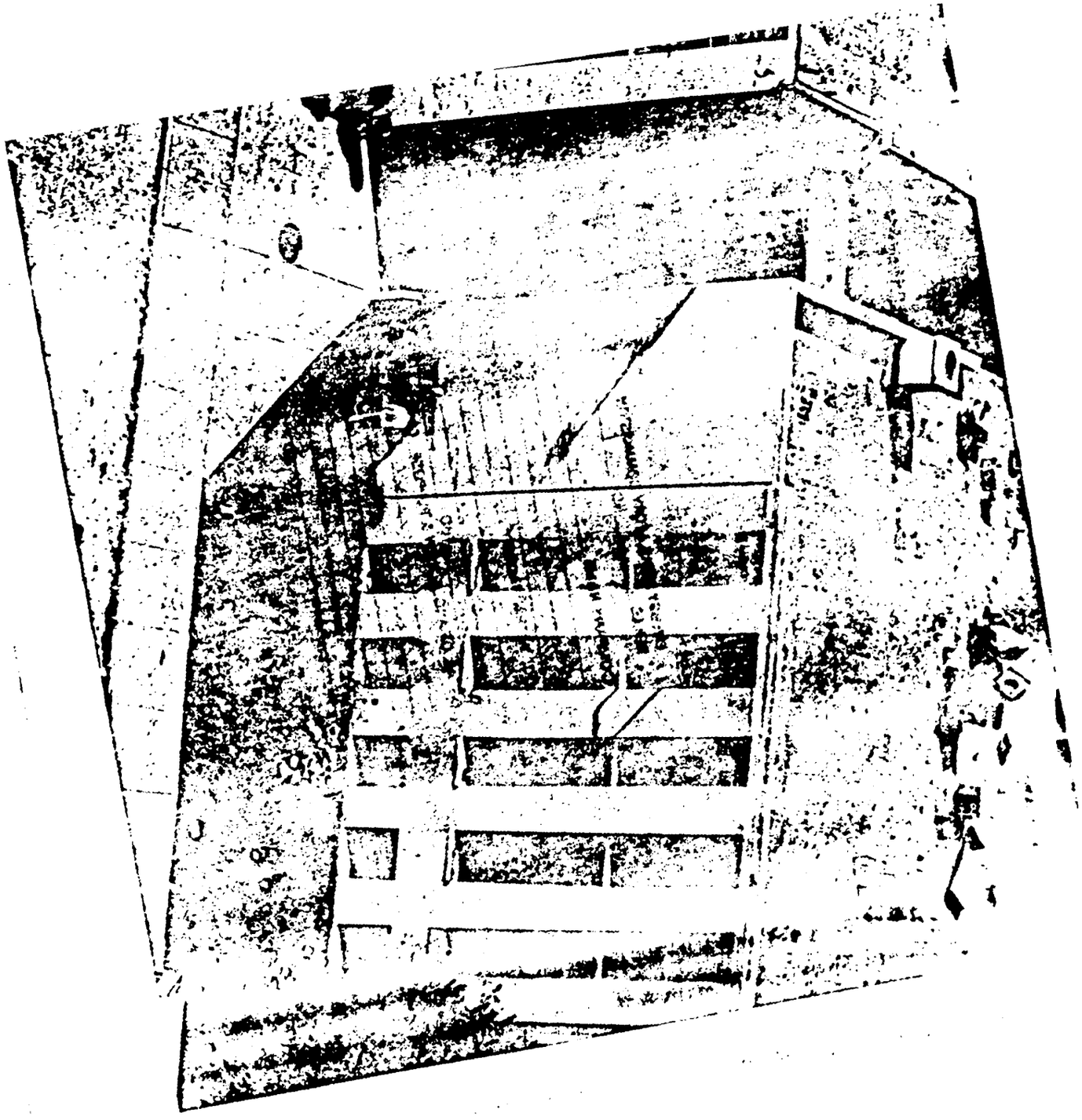
L.O.I.

LOC. WITHIN FACILITY

DATE _____ TOD _____

DETAIL OF ANGLE, VIEW & PURPOSE

SIGNATURE



ENERGY REGULATORY COMMISSION
SERIES _____ NO. _____

COMPANY NAME [illegible]

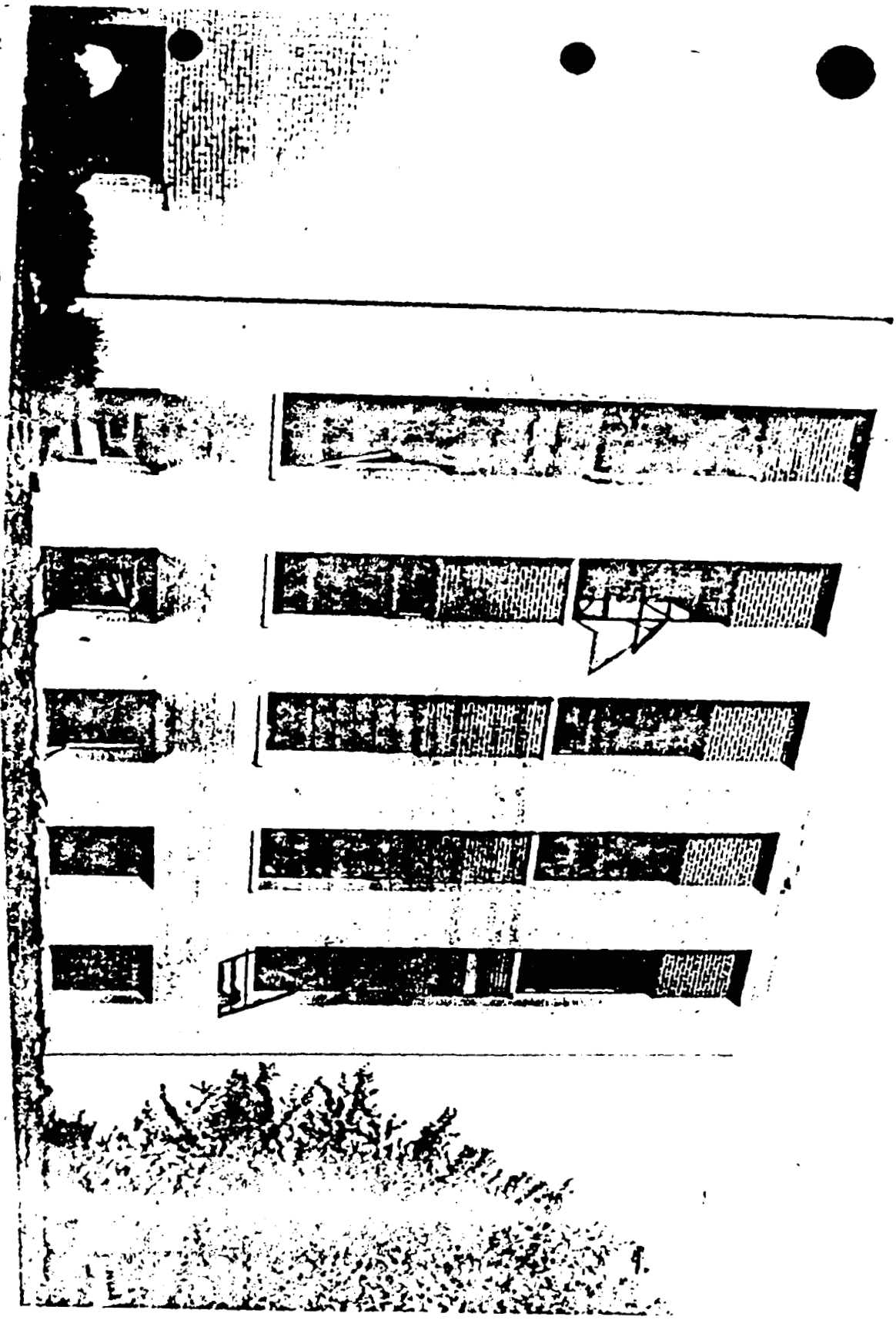
L.O.I. [illegible]

LOC. WITHIN FACILITY [illegible]

DATE [illegible] TOD _____

DETAIL OF ANGLE, VIEW & PURPOSE [illegible]

SIGNATURE [illegible]



ENERGY REGULATORY COMMISSION

SERIES _____ NO. _____

COMPANY NAME

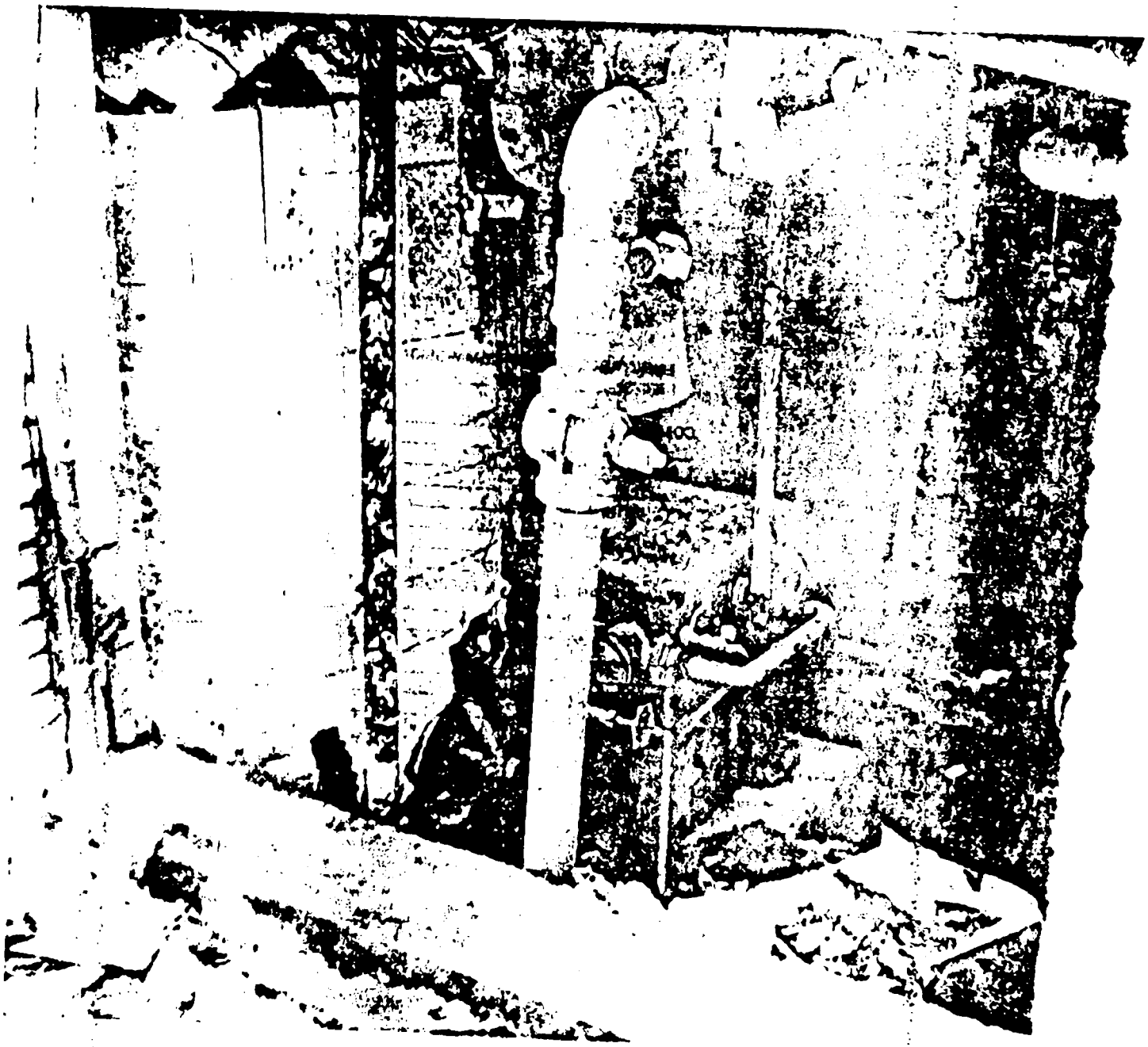
L.O.I.

LOC. WITHIN FACILITY

DATE _____ TOD _____

DETAIL OF ANGLE, VIEW & PURPOSE

SIGNATURE



ENERGY REGULATORY COMMISSION

SERIES ______ NO. ______

COMPANY NAME U.L.H.&P. Co.

L.O.I. [illegible] High School [illegible]

LOC. WITHIN FACILITY [illegible] window

DATE 10-9-80 TOD ______

DETAIL OF ANGLE, VIEW & PURPOSE [illegible]

SIGNATURE [illegible]

3B

ENERGY REGULATORY COMMISSION
SERIES _____ NO. _____

COMPANY NAME

L.O.I.

LOC. WITHIN FACILITY

DATE _____ TOD _____

DETAIL OF ANGLE, VIEW & PURPOSE

SIGNATURE

Xerox
Copies

W

ENERGY REGULATORY COMMISSION
SERIES _____ NO. 7

COMPANY NAME U.L. H. + P. Co.

L.O.I. Simon Kenton High School
Independence, Ky.

LOC. WITHIN FACILITY East Side
of boiler Room

DATE 10-9-80 TOD _____

DETAIL OF ANGLE, VIEW & PURPOSE
Compression Coupling that
seperated from piping upstream
of meter

SIGNATURE Larry L. Dunbarger

A

ENERGY REGULATORY COMMISSION
SERIES _____ NO. 2

COMPANY NAME [illegible]

L.O.I. [illegible]

LOC. WITHIN FACILITY EAST Side

DATE [illegible] TOD _____

DETAIL OF ANGLE, VIEW & PURPOSE

Compressor Complex East

Separator Discharge

Upstream of Meter

SIGNATURE [illegible]

Xerox Copies

4E

ENERGY REGULATORY COMMISSION
SERIES _____ NO. 9

COMPANY NAME U.L.H.&P. Co.

L.O.I. Simon Kenton High School
Independence, Ky.
LOC. WITHIN FACILITY STREET VALVE
FOR School - WESTside of
ROUTE 17
DATE 12-9-80 TOD _____
DETAIL OF ANGLE, VIEW & PURPOSE
VIEW OF 2"&4" VALVES AND
ALIGNMENT of SERVICE LINE TO
4" MAIN

SIGNATURE Brian K. Dunnigan

4G

ENERGY REGULATORY COMMISSION
SERIES _____ NO. 8

COMPANY NAME U.L.H.&P. Co

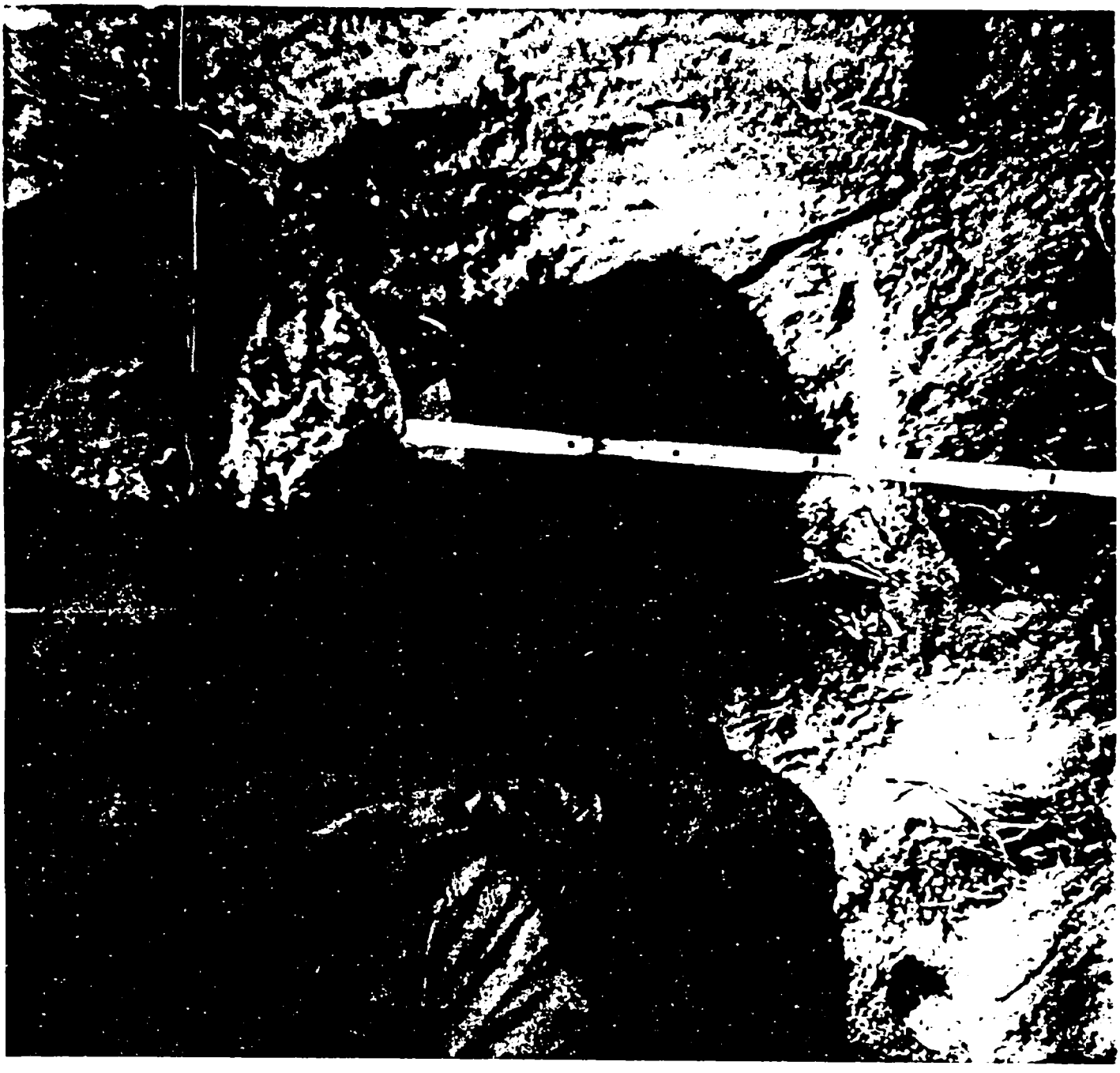
L.O.I. Simon Kenton High School
Independence, Ky.

LOC. WITHIN FACILITY STREET VALVE
For School - WEST SIDE OF
Route 17

DATE 10-9-80 TOD _____

DETAIL OF ANGLE, VIEW & PURPOSE
View of 2" & 4" VALVE AND
tie-in OF SERVICE LINE To
the 4" Line.

SIGNATURE [signature]



6A

ENERGY REGULATORY COMMISSION
SERIES _____ NO. 10

COMPANY NAME U.G. H+P Co

L.O.I. Simon Kenton High School
Independence Ky.
LOC. WITHIN FACILITY VALVE box above
STREET VALVE - WEST SIDE OF
ROUTE 17
DATE 10-9-90 TOD _____
DETAIL OF ANGLE, VIEW & PURPOSE
PORTION OF VALVE BOX IN
RELATION to STREET LEVEL

SIGNATURE [signature]

69